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Description

Switching gas damper for low-voltage power breakers

5 The invention relates to a switching gas damper for low-voltage power breakers, which is arranged as an attachment above the arcing chambers for additional damping, deionization and cooling of the switching gases, with the attachment having a cuboid enclosure
10 with a front wall, a rear wall and a cover.

Low-voltage power breakers which switch in air require an arc quenching device for operation in order to quench any switching arcs that occur, without adversely
15 affecting the power breaker itself, adjacent system parts or any other assemblies. These arc quenching devices or arcing chambers have very different physical forms, depending on the type, the physical size and the switching rating demanded of the power breaker. These
20 devices all have the common feature of a more or less parallel arrangement of arcing plates composed of sheet steel and arranged transversely with respect to the switching arc.

25 In order to reliably quench switching arcs, the switching gases produced do not have to be cooled down to room temperature. At least when the rating of an arc quenching chamber is fully utilized, it is thus possible for gases to emerge from the arcing chamber at
30 a temperature that is considerably greater than room temperature. Metal vapor residues can thus also be carried with the gases, and there may be a certain amount of ionization. The installation type of power breaker governs whether such phenomena are harmless.
35 Fundamentally, it can be stated that an

amount of metal vapor and residual ionization become less acceptable the shorter the distance between the outlet openings from the arc quenching chambers and adjacent live or grounded components. This distance is
5 an important cost factor in the construction of switchgear assemblies, since the dimensions of the switchgear assemblies depend on it.

On the other hand, the cost rises when arc quenching
10 chambers are designed such that they satisfy the most stringent requirements with regard to the characteristics of the switching gases that occur. For this reason, the approach has therefore been adopted of equipping low-voltage power breakers with standard
15 arcing chambers which result in a given switching rating, but which represent a compromise between the minimum and maximum requirements with regard to the characteristics of the switching gases that occur. For situations in which a power breaker must be
20 accommodated in a particularly space-saving manner in a switchgear assembly, additional switching gas dampers are provided, which are associated individually with each arcing chamber (DE 35 41 514 C2) or jointly with all the arcing chambers (EP 0 437 151 B1).

25 In consequence, the object of the present invention is to provide a switching gas damper for low-voltage power breakers as an attachment above the arcing chambers for additional damping, deionization and cooling of the
30 switching gases, which involves little material and installation complexity and ensures that no ionized switching gases that are still hot can enter those areas of the switchgear assembly in which they can cause damage.

35 For this purpose, the invention is based on the type of switching gas damper according to EP 0 437 151 B1 and achieves said object in that the cover is closed

and a bottom having separate inlet openings is provided for receiving switching gas flows from each arcing chamber in the low-voltage power breaker, and in that each inlet opening has an associated outlet channel,
5 which is formed by channel walls and/or deflection elements, in order to dissipate the switching gas flows at the sides.

One major feature of the invention is the provision of
10 separate outlet channels for the switching gas flows from the individual arcing chambers in a common enclosure, since this advantageously allows the total volume to be made small. Carrying the switching gas flows away at the sides avoids any contact with the
15 power breaker connecting rails at the rear.

For the purposes of the invention, an arrangement is recommended for three-pole low-voltage power breakers in which a channel wall is arranged parallel to the
20 front wall and a further channel wall is arranged parallel to the rear wall, thus, in conjunction with deflection elements, forming a total of three outlet channels of which the outer outlet channels, which are bounded by the front wall and by the rear wall, are
25 closed on opposite sides by a side wall, and the central outlet channel, which is bounded by the channel walls, is open on both sides, such that the switching gas flows which emerge from the outer arcing chambers of the low-voltage power breaker are carried away
30 separately on opposite sides, while the switching gas flow which emerges from the central arcing chamber passes from the switching gas damper to free space on both sides through the central outlet channel. Despite the switching gas damper having small dimensions this
35 advantageously results in long flow paths, with a correspondingly advantageous cooling effect on the switching gases.